REMARKS

In the Office Action, the Examiner noted that an IDS dated 4/21/03 is listed on the application, but that no references are cited with the IDS. The Examiner rejected claims 27, 38, 47, and 50 under § 102 as being anticipated by USP 6,058,254 issued to Scepanovic, et al. (Scepanovic). The Examiner rejected claims 27-34, 38-45, and 47-52 under § 103 as being unpatentable over USP 5,784,289 issued to Wang, et al. (Wang) in view of Scepanovic. The Examiner rejected claims 35-37 and 46 for their dependence upon a rejected base claim. However, the Examiner found claims 35-37 and 46 otherwise allowable. In this Amendment, Applicants have amended the independent claims 28, 37, 46, 48, and 50. No claims have been added or canceled. Accordingly, claims 27-52 will be pending after entry of this Amendment.

I. Interview

Applicants respectfully thank the Examiner for the personal interview on August 17, 2004. During the personal interview, no exhibit was shown or demonstration conducted. Applicants' representative discussed the independent claims and the cited references with the Examiner. Pursuant to the agreement reached with the Examiner, Applicants have amended the independent claims 28, 37, 48, and 50 to include the limitation that some of the identified sets of potential routes have at least two routes.

II. Information Disclosure Statement Dated April 16, 2003

In the Office Action, the Examiner noted that an IDS dated 4/21/03 is listed on the application, but that no references are cited with the IDS. Attached is a copy of a postcard that was returned from the Patent Office on 4/21/03 showing that the Office received the IDS and all its references. Applicants will contact the Examiner in the next week to discuss how best to get another set of the references to the Examiner on an expedited basis.

III. Rejections to Claims 27-34

The Examiner rejected claim 27 under § 102 as being anticipated by Scepanovic. The Examiner rejected claims 27-34 under § 103 as being unpatentable over Wang in view of Scepanovic.

Claims 28-34 are dependent directly or indirectly on independent claim 27. Claim 27 recites a method of routing several nets in a region of an integrated circuit ("IC") layout. Each net has a set of pins in the region. This method partitions the region into several sub-regions, where several edges exist between the sub-regions. The method identifies, for each particular net, an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge. A potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins. Each of several sets of potential routes includes at least two routes. The method uses the identified edge-intersect probabilities to identify routes for the net.

Applicants respectfully submit several reasons that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. First, the Examiner identifies Figures 3 and 4, column 3, and column 5, line 25 through column 6 of Scepanovic as disclosing the identification of an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge limitation of claim 27. However, these passages of Scepanovic disclose a horizontal routing density determined by computing the probability of wires going through a piece. A piece is defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece is not an edge. Therefore, Scepanovic does not disclose, teach, or even suggest the recited method of claim 27 that identifies, for each particular net, an edge-

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intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge.

Second, the Examiner identifies column 5, lines 1-18 of Scepanovic as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 27. However, this passage of Scepanovic discloses using a piece-density/probability to modify cell placement. Scepanovic does not disclose using a probability to identify routes for a net. Therefore, Scepanovic does not disclose, teach, or even suggest the method of claim 27 that uses identified edge-intersect probabilities to identify routes for the nets.

Third, the Examiner identifies column 6, lines 23-46 of Wang as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 27. However, this passage of Wang discloses using a probable density to either construct a congestion map and/or predict if a placement is unroutable. Wang does not disclose using a probable density to identify routes for nets. Therefore, Wang does not disclose, teach, or even suggest the method of claim 27 that uses identified edge-intersect probabilities to identify routes for the nets.

Fourth, Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest a method that identifies, for each particular net, a potential route for a particular net that traverses the set of sub-regions that contain the particular net's set of pins, where each of several sets of potential routes includes at least two routes.

Accordingly, Applicants respectfully submit that the cited references do not render claim 27 unpatentable. As claims 28-34 are dependent on claim 27, Applicants respectfully submit that claims 28-34 are patentable over the cited references for at least the same reasons as claim 27. In

view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 27-34.

IV. Rejections to Claims 38-45

The Examiner rejected claim 38 under § 102 as being anticipated by Scepanovic. The Examiner rejected claims 38-45 under § 103 as being unpatentable over Wang in view of Scepanovic.

Claims 39-45 are dependent directly or indirectly on independent claim 38. Claim 38 recites a method of routing several nets in a region of an integrated circuit ("IC") layout. Each net has a set of pins in the region. This method partitions the region into several sub-regions, where several paths exist between the sub-regions. The method identifies, for each particular net, a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path. A potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins. Each of several sets of potential routes includes at least two routes. The method uses the identified path-use probabilities to identify routes for the net.

Applicants respectfully submit several reasons that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. First, the Examiner identifies Figures 3 and 4, column 3, and column 5, line 25 through column 6 of Scepanovic as disclosing the identification of a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path limitation of claim 38. However, these passages of Scepanovic disclose a horizontal routing density determined by computing the probability of wires going through a piece. A piece is defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece

view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 27-34.

IV. Rejections to Claims 38-45

The Examiner rejected claim 38 under § 102 as being anticipated by Scepanovic. The Examiner rejected claims 38-45 under § 103 as being unpatentable over Wang in view of Scepanovic.

Claims 39-45 are dependent directly or indirectly on independent claim 38. Claim 38 recites a method of routing several nets in a region of an integrated circuit ("IC") layout. Each net has a set of pins in the region. This method partitions the region into several sub-regions, where several paths exist between the sub-regions. The method identifies, for each particular net, a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path. A potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins. Each of several sets of potential routes includes at least two routes. The method uses the identified path-use probabilities to identify routes for the net.

Applicants respectfully submit several reasons that the cited references neither separately nor in combination disclose, teach, or even suggest such a method. First, the Examiner identifies Figures 3 and 4, column 3, and column 5, line 25 through column 6 of Scepanovic as disclosing the identification of a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path limitation of claim 38. However, these passages of Scepanovic disclose a horizontal routing density determined by computing the probability of wires going through a piece. A piece is defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece

is not a path. Therefore, Scepanovic does not disclose, teach, or even suggest the recited method of claim 38 that identifies, for each particular net, a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path.

Second, the Examiner identifies column 5, lines 1-18 of Scepanovic as disclosing the using the identified path-use probabilities to identify routes for the nets limitation of claim 38. However, this passage of Scepanovic discloses using a piece-density/probability to modify cell placement. Scepanovic does not disclose using a probability to identify routes for a net. Therefore, Scepanovic does not disclose, teach, or even suggest the method of claim 38 that uses identified path-use probabilities to identify routes for the nets.

Third, the Examiner identifies column 6, lines 23-46 of Wang as disclosing the using the identified path-use probabilities to identify routes for the nets limitation of claim 38. However, this passage of Wang discloses using a probable density to either construct a congestion map and/or predict if a placement is unroutable. Wang does not disclose using a probable density to identify routes for nets. Therefore, Wang does not disclose, teach, or even suggest the method of claim 38 that uses identified path-use probabilities to identify routes for the nets.

Fourth, Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest a method that identifies, for each particular net, a potential route for a particular net that traverses the set of sub-regions that contain the particular net's set of pins, where each of several sets of potential routes includes at least two routes.

Accordingly, Applicants respectfully submit that the cited references do not render claim 38 unpatentable. As claims 39-45 are dependent on claim 38, Applicants respectfully submit that claims 39-45 are patentable over the cited references for at least the same reasons as claim 38. In

view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 38-45.

V. Rejections to Claims 47 and 48

The Examiner rejected claim 47 under § 102 as being anticipated by Scepanovic. The Examiner rejected claims 47 and 48 under § 103 as being unpatentable over Wang in view of Scepanovic.

Claim 48 is dependent directly on independent claim 47. Claim 47 recites a computer program embedded in a computer readable medium for routing several nets in a region of an integrated circuit ("IC") layout. Each net has a set of pins in the region. This computer program has instructions for partitioning the region into several sub-regions, where several edges exist between the sub-regions. The computer program identifies, for each particular net, an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge. A potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins. Each of several sets of potential routes includes at least two routes. The computer program uses the identified edge-intersect probabilities to identify routes for the net.

Applicants respectfully submit several reasons that the cited references neither separately nor in combination disclose, teach, or even suggest such a computer program. First, the Examiner identifies Figures 3 and 4, column 3, and column 5, line 25 through column 6 of Scepanovic as disclosing the identification of an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge limitation of claim 47. However, these passages of Scepanovic disclose a horizontal routing density determined by computing the probability of wires going through a piece. A piece is

defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece is not an edge. Therefore, Scepanovic does not disclose, teach, or even suggest the recited computer program of claim 47 that identifies, for each particular net, an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge.

Second, the Examiner identifies column 5, lines 1-18 of Scepanovic as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 47. However, this passage of Scepanovic discloses using a piece-density/probability to modify cell placement. Scepanovic does not disclose using a probability to identify routes for a net. Therefore, Scepanovic does not disclose, teach, or even suggest the computer program of claim 47 that uses identified edge-intersect probabilities to identify routes for the nets.

Third, the Examiner identifies column 6, lines 23-46 of Wang as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 47. However, this passage of Wang discloses using a probable density to either construct a congestion map and/or predict if a placement is unroutable. Wang does not disclose using a probable density to identify routes for nets. Therefore, Wang does not disclose, teach, or even suggest the computer program of claim 47 that uses identified edge-intersect probabilities to identify routes for the nets.

Fourth, Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest a method that identifies, for each particular net, a potential route for a particular net that traverses the set of sub-regions that contain the particular net's set of pins, where each of several sets of potential routes includes at least two routes.

defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece is not an edge. Therefore, Scepanovic does not disclose, teach, or even suggest the recited computer program of claim 47 that identifies, for each particular net, an edge-intersect probability for each particular edge that specifies the probability that a set of potential routes for the particular net will intersect the particular edge.

Second, the Examiner identifies column 5, lines 1-18 of Scepanovic as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 47. However, this passage of Scepanovic discloses using a piece-density/probability to modify cell placement. Scepanovic does not disclose using a probability to identify routes for a net. Therefore, Scepanovic does not disclose, teach, or even suggest the computer program of claim 47 that uses identified edge-intersect probabilities to identify routes for the nets.

Third, the Examiner identifies column 6, lines 23-46 of Wang as disclosing the using the identified edge-intersect probabilities to identify routes for the nets limitation of claim 47. However, this passage of Wang discloses using a probable density to either construct a congestion map and/or predict if a placement is unroutable. Wang does not disclose using a probable density to identify routes for nets. Therefore, Wang does not disclose, teach, or even suggest the computer program of claim 47 that uses identified edge-intersect probabilities to identify routes for the nets.

Fourth, Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest a method that identifies, for each particular net, a potential route for a particular net that traverses the set of sub-regions that contain the particular net's set of pins, where each of several sets of potential routes includes at least two routes.

Accordingly, Applicants respectfully submit that the cited references do not render claim 47 unpatentable. As claim 48 is dependent on claim 47, Applicants respectfully submit that claim 48 is patentable over the cited references for at least the same reasons as claim 47. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 47 and 48.

VI. Rejections to Claims 50-52

The Examiner rejected claim 50 under § 102 as being anticipated by Scepanovic. The Examiner rejected claims 50-52 under § 103 as being unpatentable over Wang in view of Scepanovic.

Claims 51 and 52 are dependent directly or indirectly on independent claim 50. Claim 50 recites a computer program embedded in a computer readable medium for routing several nets in a region of an integrated circuit ("IC") layout. Each net has a set of pins in the region. This computer program has instructions for partitioning the region into several sub-regions, where several paths exist between the sub-regions. The computer program identifies, for each particular net, a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path. A potential route for a particular net traverses the set of sub-regions that contain the particular net's set of pins. Each of several sets of potential routes includes at least two routes. The computer program uses the identified path-use probabilities to identify routes for the net.

Applicants respectfully submit several reasons that the cited references neither separately nor in combination disclose, teach, or even suggest such a computer program. First, the Examiner identifies Figures 3 and 4, column 3, and column 5, line 25 through column 6 of Scepanovic as disclosing the identification of a path-use probability for each particular path that specifies the

probability that a set of potential routes for the particular net will use the particular path limitation of claim 50. However, these passages of Scepanovic disclose a horizontal routing density determined by computing the probability of wires going through a piece. A piece is defined as an area enclosed by horizontal lines and vertical column borders. (See Scepanovic column 3, lines 30-35). A piece is not a path. Therefore, Scepanovic does not disclose, teach, or even suggest the recited computer program of claim 50 that identifies, for each particular net, a path-use probability for each particular path that specifies the probability that a set of potential routes for the particular net will use the particular path.

Second, the Examiner identifies column 5, lines 1-18 of Scepanovic as disclosing the using the identified path-use probabilities to identify routes for the nets limitation of claim 50. However, this passage of Scepanovic discloses using a piece-density/probability to modify cell placement. Scepanovic does not disclose using a probability to identify routes for a net. Therefore, Scepanovic does not disclose, teach, or even suggest the computer program of claim 50 that uses identified path-use probabilities to identify routes for the nets.

Third, the Examiner identifies column 6, lines 23-46 of Wang as disclosing the using the identified path-use probabilities to identify routes for the nets limitation of claim 50. However, this passage of Wang discloses using a probable density to either construct a congestion map and/or predict if a placement is unroutable. Wang does not disclose using a probable density to identify routes for nets. Therefore, Wang does not disclose, teach, or even suggest the computer program of claim 50 that uses identified path-use probabilities to identify routes for the nets.

Fourth, Applicants respectfully submit that the cited references neither separately nor in combination disclose, teach, or even suggest a method that identifies, for each particular net, a

potential route for a particular net that traverses the set of sub-regions that contain the particular net's set of pins, where each of several sets of potential routes includes at least two routes.

Accordingly, Applicants respectfully submit that the cited references do not render claim 50 unpatentable. As claims 51 and 52 are dependent on claim 50, Applicants respectfully submit that claims 51 and 52 are patentable over the cited references for at least the same reasons as claim 50. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §§ 102 and 103 rejections of claims 50-52.

VII. Allowable Claims

In the Office Action, the Examiner found that claims 35-37 and 46 contain allowable subject matter, but objected to these claims as being dependent upon a rejected base claim. The Applicants thank the Examiner for these findings of allowability. These claims have not been rewritten in independent form as their intervening base claims are believed to be allowable as discussed above.

CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 27-52, are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

STATTLER, JOHANSEN & ADELI LLP

Dated: 9/1/04

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